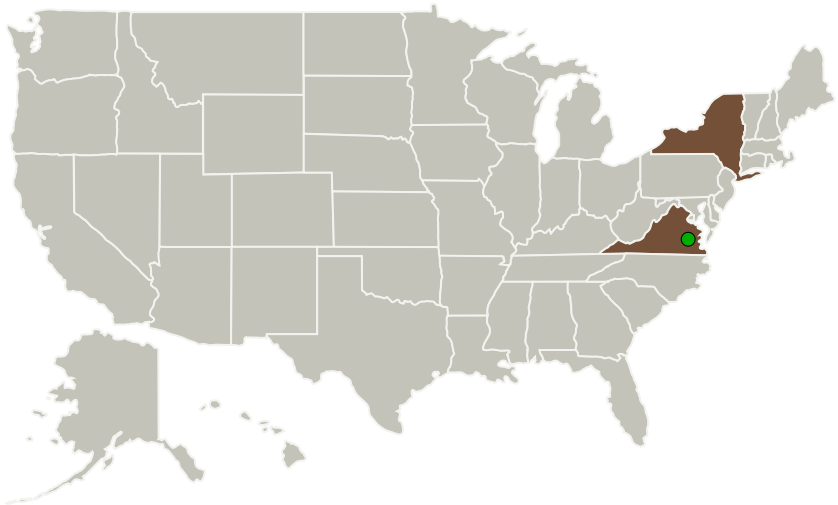
# Strut Attachment System for In-Space Robotic Assembly, Phase I

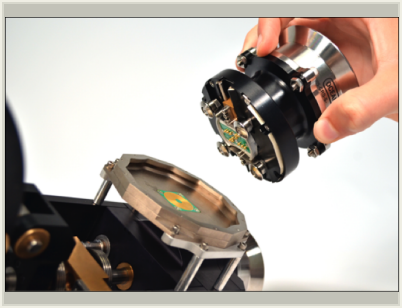
Completed Technology Project (2016 - 2016)

## Project Introduction

The size of space systems is currently limited to payload envelopes of existing launch vehicles. Due to this and the customized nature of satellites, existing space systems are very costly to stand up. Nor are they designed for repair, upgrade, or reuse to amortize the cost over multiple missions. As missions get further from low-earth orbit (LEO), the dangers of human extra-vehicular activity (EVA) for manual on-orbit assembly or repair increases making robotic assembly of large structures very desirable. Honeybee Robotics (Honeybee) proposes to develop a Strut Attachment System (SAS) that provides a common electromechanical connection architecture for robotic on-orbit structures assembly. The SAS will enable the creation of networked space frame structures with a strut/node architecture; enable payload docking to those structures for power and data transfer; and enable the creation of reusable, serviceable, and upgradable vehicle systems in support of lower cost space exploration. The SAS will leverage technology that Honeybee developed for robotic satellite servicing (DARPA Satlet Grasper Tool | TRL-5). The proposed Phase 1 technical approach is to modify the Satlet Grasper Tool and receptacle designs to increase the connection's strength, rigidity, and power/data transmission capability. The SAS will consist of the Strut Attachment Mechanism, Strut Receptacle, and Node. The Phase 1 project will result in a Strut Attachment Mechanism and Strut Receptacle at TRL of 4 at the end of Phase 1 and TRL 5-6 at the end of Phase 2.

## Primary U.S. Work Locations and Key Partners





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## Table of Contents

**Small Business Innovation Research/Small Business Tech Transfer**

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Honeybee Robotics, Ltd. | Lead Organization | Industry | Pasadena, California |
| Langley Research Center(LaRC) | Supporting Organization | NASA Center | Hampton, Virginia |

| Primary U.S. Work Locations | |
|---|---|
| New York | Virginia |

## Project Transitions

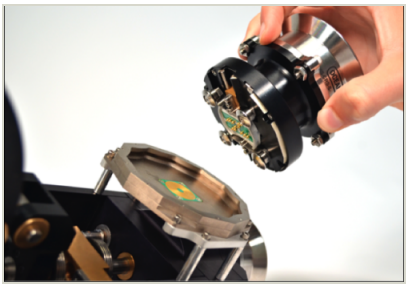
**June 2016:** Project Start

**December 2016:** Closed out

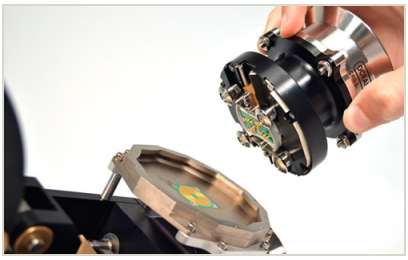
**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/141018)*

## Images



**Briefing Chart Image**
Strut Attachment System for In-Space Robotic Assembly, Phase I
*(https://techport.nasa.gov/image/131151)*



**Final Summary Chart Image**
Strut Attachment System for In-Space Robotic Assembly, Phase I Project Image
*(https://techport.nasa.gov/image/128860)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
Honeybee Robotics, Ltd.

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

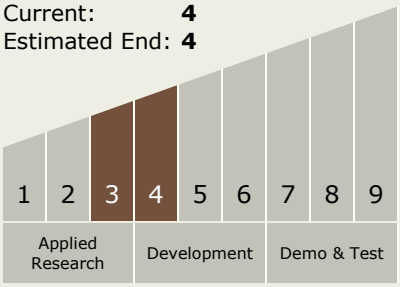
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Jason Herman

## Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



# Strut Attachment System for In-Space Robotic Assembly, Phase I

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## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.3 Mechanical Systems
    - TX12.3.1 Deployables, Docking, and Interfaces

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System